

sary to admit so great an elevation of the reflecting matter above the earth, and thus remove a serious difficulty in explaining the glow by known causes.

In no case here has the sun during the day or at setting appeared green. On December 28 and January 13 Venus has appeared a beautiful green through the complementary crimson. This fact became important only when it was discovered that the green remained after the crimson had disappeared. The light of the planet was struggling through some medium invisible to the eye, but which arrested the other colour.

Another important point. The glow has been seen without the slightest trace of cirrus clouds behind it. Three times faint ribbon-like stripes of cirri appeared in the first glow, but in the second the gorgeous crimson has generally been projected against the clear blue sky.

The writer has seen no notice of observations on the appearance of the sun and sky during the day, and especially the afternoon, before the brilliant sunsets.

The peculiar appearance of the atmosphere in the vicinity of the sun attracted his attention on the day the first remarkable sun glow occurred. The sky was perfectly clear except around the sun, which was embedded in a soft haze that extended out some 6° or 8° on every side. Let a distant boundary could not be assigned to the haze, so gradually did it shade into the blue of the sky. The sun was obscured so that the eye could look at it for a moment and outline its disk. Covering the sun with the hand the haze adjacent glowed like a furnace, the light diminishing rapidly as the eye swept outwards.

Two or three remarks, naturally spring from this appearance. 1. The haze was not an ordinary cirrus cloud. It had no distinct bounding surfaces; it was invisible everywhere except near the sun. 2. There was, of course, no more of the matter forming the haze around the sun than elsewhere. 3. It was capable of reflecting intensely the light that fell upon it at a large incident angle, nearly 90°. 4. The reflection of light in a high degree by any substance at a large incidence would indicate a liquid. But the clearness of the sky showed the absence of condensed vapour. And yet there was something in the air around the sun—and no more there than anywhere else—which was then, some three hours farther east, flinging its gorgeous crimson over earth and sky, and which, three hours later, would drape the earth and sky of the observer in the same beautiful colours. And what was that something? That is doubtless the great question, and I can only echo, What was it? If the answer be "Vapour of water in some peculiar state," then it is wondrous strange that water, subject as it always has been to almost every conceivable change in the air, should rarely if ever before have assumed this peculiar state! Besides, the prevalence of this phenomenon around the globe, manifesting the same characteristics everywhere, requires some marked and probably unusual cause.

As to the volcanic theory, it has some good points. It gives an unusual explanation for an unusual occurrence.

It might be expected that a convulsion which would engulf islands and mountains, and send the throbblings of ocean around the globe, would leave some tokens of its presence on the more sensitive air.

The difficulty of accounting for the suspension of solid particles for months in air of extreme rarity may be avoided by admitting the effects to be due mainly to gases ejected in the eruptions. Most of these being condensable by extreme cold would occupy definite strata and not rise to an extreme height.

The sinking of Krakatoa and the admission of sea water to the awful and fiery gulfs below, would, it seems, set free immense quantities of chlorine from the salt water. As this gas is readily absorbed by pure water it may have condensed around its molecules the vapour of the air, and thus become capable of reflecting the light in a higher degree.

Of course these are suppositions, consistent as far as we know with law; and they may stand among other probabilities till clearer light confirms or rejects them.

In a communication to NATURE, December 13, p. 149, Prof. C. Piazz Smyth advances the idea that one of the conditions of the red sunsets was the *dryness* of the lower atmosphere. The hygrometric condition of the air here on the days the crimson sunsets were seen, is given in the following table, taken from the monthly reports of the writer to the U.S. Signal Office. The two columns give the mean temperature of the dry and wet bulb thermometers (F.) for three observations each day, at 7.32 a.m., 2.32 and 9.32 p.m.

Dates			Dry bulb			Wet bulb
November 27	...	...	29	...	...	26.8
December 5	...	...	40	...	...	38
" 9	...	...	36.6	...	...	32
" 10	...	...	36	...	...	33
" 25	...	...	29.5	...	...	26
" 28	...	...	23.6	...	...	22.2
January 13	...	...	37	...	...	33
" 17	...	...	23.2	...	...	21.2

A mere inspection of the table shows that the dew point was high, and the percentage of possible moisture in the air quite large. Whether this weird and beautiful play of colours around the dying day is due to watery vapour in the air time will show; here it has certainly not been due to any deficiency in the vapour of the lower strata.

O. N. STODDARD

Wooster, State of Ohio, United States, January 18

Unconscious Bias in Walking

THE following little experiment seems to show that if the majority of people are, as Mr. Darwin argues, left-legged, they would circle to the left in a mist, as Mr. Larden says they do. I would call myself normal, my left leg being the stronger. That is to say, like the majority, I jump from the left, rest my weight standing on the left (a glance at a photograph album shows this to be normal) and generally cross my right over my left whilst sitting. Having put myself in a dark empty room, I could not satisfy myself as to which way I circled, there not being space enough, but when I artificially lamed myself by putting a few tin tacks in my slipper, I circled strongly in the direction of the sound foot. From what had been said in NATURE on the subject at the time, I expected the for-the-time-being longer and stronger limb to circle round the other. The fact seems to be that there is a bias towards the stronger, most-leant-upon limb, irrespective of length. It is worth noting that, if the object causing pain be placed under the inside of, say, the right foot only, the experimenter will lean on the outside of that foot and circle to the right.

In the matter of left-leggedness I have requested several right-handed people to feign lameness. Every one of them has limped with the right foot; and, on being asked to do so, has found difficulty in imagining the left lame, and acting as if it were. May it not be because the right leg is somewhat weaker than canes are carried in the right hand?

But although left-leggedness *quâ* strength seems normal, the reverse seems to hold good *quâ* skill: one pushes a door to with the right, feels his way down a dark stair with the right, kicks a football with the right. A friend of mine, a skilful athlete, particularly known as a jumper, at first expressed astonishment that there should be any doubt as to the left leg being the stronger. On reflection he added: "I'm not sure, however; figures in skating are easier on the right." This nine figure-skaters out of ten will assent to. It is to be expected, if my theory is correct. The right leg is more easily controlled, guided, and kept in position—in a word, the more skilful limb; and at the same time the left being the better kicker, the impulse is better given.

It seems to me that mounting a horse from the near side is not a mere fashion (except for the left-handed minority). The stronger leg is put in the stirrup and gives the lift, whilst the more skilful leg is thrown over the animal's back.

It would be interesting to know which foot it is, if any in particular, which Indian servants use for prehensile purposes; also whether the higher quadrumana are right or left hind-handed.

I have noticed that persons walking in the street dwell longer on the one foot than on the other, and I remember once arguing that in-toed persons with a rolling gait were the only people who were not lame. I have been trying to observe this seriously for some days, and believe it to be so, but as the mind naturally invents a beginning and an end for a continuous motion it may be imagination.

W. G. SIMPSON

5, Randolph Cliff, Edinburgh, February 6

The Ear a Barometer

THE phenomenon described by my friend Mr. Boys, on p. 333, is pathological, and not physiological. He is clearly suffering from slight obstruction of the Eustachian tube, a canal which leads from the inner side of the tympanic cavity into the posterior fauces. Its natural relief is, as he very accurately describes, by

the act of swallowing, which temporarily distends the tube. He can test its perviousness by holding his nose with his fingers and forcing air into the nasal cavity. Physicians are in the habit of placing an ordinary stethoscope over the ear, causing the patient to go through the act of deglutition, and listening for the "click" of escaping air. Mr. Boys will see, as a physicist, that, if the access of air on either side of the tympanum were free, increase or decrease of atmospheric pressure would make no difference.

14, Dean's Yard, February 10

W. H. STONE

WITH regard to the letter of Mr. C. V. Boys in NATURE of February 7 (p. 333), I should like to make a remark or two on the matter, in which I have had practical experience. I am in the habit of running between Rugby and London daily, and pass through six different tunnels on the route. The Leighton tunnel is divided into three parts, the down fast line being single, and the space between the rails and the walls of the tunnel very small. On entering this, if in the first three coaches next to the engine, a sudden expansion of the tympanum is felt. I have been led to account for this phenomenon as follows: The engine acting as a piston forces the air before it through the tunnel, and so causes a partial vacuum, which extends to the first three or four coaches. After that the air has had time to rush in and fill the empty space, and this explanation is rendered almost certain by the fact that at the end of the train of twelve or fourteen coaches no aural effects are observable, thus demonstrating that the sudden propulsion of the air through the tunnel is compensated for before the middle of the train has entered. In Kilsby tunnel nothing has been noticed by myself. I account for the pressure alteration in the above manner, the engine and the tunnel-mouth closely fitting, and so are fairly comparable to a piston within a cylinder. The effects decrease from the engine to the end of the train, and are practically unobservable in the last few coaches.

Rugby, February 9

GEORGE RAYLEIGH VICARS

Diffusion of Scientific Memoirs

ALLOW me a few final words on this curious case. I spoke of the *Trans. C. P. S.*, 1849-54, in which Stokes' papers were "buried," as "almost inaccessible." This expression was challenged by the ex-Secretary of the Society, and I replied that the question could be decided by statistics alone. I indicated what statistics were required, and waited some weeks for them. The present Secretary then gave me the less essential part of the desired information, and I proceeded to make the best I could of it. Now I am told that I misunderstood his object, and that he practically admits what his predecessor challenged.

I also stated that my copy of the *Proc.* was very imperfect, and that I had not received any *Trans.* I was then told that "publications" were given only on application. If so, I replied, I should have had all, or none. To this there is no answer.

P. G. TAIT

Coll. Edin., February 9

Wind Sand Ripples

SOME time ago, whilst reading an account in NATURE of very ingenious and interesting experiments by Prof. G. H. Darwin on sand ripples, my memory was recalled to some very beautiful sand ripples caused by the action of wind, seen by another person and myself on the west coast of Ireland, near Bundoran. The locality was a sand ridge twenty or thirty feet above high-water mark, and beyond the influence of either sea or river action; the ripples extended over a space of twenty yards or more. At the time there was a fresh breeze, with frequent squalls, blowing across this ridge. This ripples moved before the wind at the rate of about a foot in three or four minutes, but faster during the squalls, retaining all the time (I watched them an hour or more) perfect uniformity of shape and size. The distances were roughly measured by sticking up in the sand bits of wood at, as nearly as could be guessed, one foot apart, in a line with the direction of the wind. The ripples were about three inches from summit to summit, and the depth of trough three quarters of an inch.

The time was carefully noted with a watch. The forward movement of the ripples was evidently caused by the sand being drifted from their weather sides, and deposited on their lee, and thus there was a progressive movement to leeward, more or less rapid according to the increase or diminution of the wind force.

4, Addison Gardens, February 9

JOHN RAE

Animal Intelligence

THE following anecdote, received the other day from Russia, may possibly interest your readers:—"The following was narrated to me by Mohl's brother, on whose estate it took place. The carcass of a cow was laid out in the woods to attract the wolves, and a spring-trap was set. Next morning the forester found there the track of a bear instead of a wolf on the snow; the trap was thrown to some distance. Evidently the bear had put his paw in the trap and had managed to jerk it off. The next night the forester hid himself within shot of the carcass to watch for the bear. The bear came, but first pulled down a stack of firewood cut into seven-foot lengths, selected a piece to his mind, and, taking it up in his arms, walked on his hind legs to the carcass. He then beat about in the snow all round the carcass with the log of wood before he began his meal. The forester put a ball in his head, which I almost regret, as such a sensible brute deserved to live."

J. M. HAYWARD

Sidmouth, February 9

Circular Rainbow seen from a Hill-top

CLIMBING, several summers ago, with three friends among the Coolin Hills in Skye, I was fortunate enough to witness phenomena similar to those described by Mr. Fleming in last week's NATURE (p. 310). Our shadows were apparently thrown against the precipitous side of a deep corry, distant 200 feet or perhaps more. They vanished and reappeared as thin mists passed through the corry, the sun shining continuously. We could not see each other's shadows unless close. The distance apart at which they became visible I do not clearly remember, but know it was approximately as one of my friends, Mr. W. A. Brown, writes:—"So long as we kept a few yards apart each could only see his own shadow, but when two were within arms' length a double shadow was visible to each, and on getting still nearer the shadows merged into each other." My estimate of the angle subtended by the diameter of the rainbow is 15°, that of my friend 10°. He adds, however, "I may be very far out in this."

J. M. WHITE

Spring Grove, Dundee, February 5

REFERRING to Mr. Fleming's letter in NATURE of January 31 (p. 310), I would state that many years ago, before Pontresina, in the Grisons, was so resorted to as it is now, I walked up the Piz Languard early one fine morning with an old smuggler and chamois hunter—the terms are synonymous on the frontier—named Colani. On the summit of the peak is a ledge of rock, on which I lay down for twenty minutes' sleep. I had been asleep but a few minutes when Colani woke me, and, with excuses and an expression of fright on his face, begged me to come with him to see something which he had never seen in his life before. We moved to the western edge of the peak. Below us were some thin clouds of mist curling about like vapour from a large cauldron. On these clouds appeared a circular rainbow and within it, as though in a gilded frame, were two figures—in fact, the shadows of ourselves.

"There are two of them now," cried Colani, and it was not until I told him to take off his hat and wave it, as I did mine, and he saw the action repeated by the figures, that he began to feel assured they were not "Geists." It was not the "Arch St. Martin," a Romansch name for a rainbow, which had frightened him, though it was the first time he had seen a circular one, but the appearance of the dark solitary figure had awakened his conscience, for some of his smuggling adventures had not been without bloodshed. The details of the phenomenon were the same as those described by Mr. Fleming, with the exception, perhaps, that the figures were more vivid and the whole spectacle of longer duration, owing to an unclouded sun.

A similar appearance has lately been seen on the Tonjale Range in Nevada, by Mr. R. A. Marr, of the Coast and Geodetic Survey. I subjoin his description of it, taken from a recent number of the *Mail*.

T. R. MAYNARD

The Black Forest, February 7

"Suddenly, as I stood looking over the vast expanse beneath me, I saw myself confronted by a monster figure of a man standing in mid air before me, upon the top of a clearly-defined mountain peak, which had but the thin air of the valley below for a resting place. The figure was only a short distance from me. Around it were two circles of rainbow light and colour, the outer one faintly defined as compared with the inner one, which was